

CLAIMS

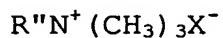
1. A composition for forming a porous film comprising a surfactant, an aprotic polar solvent and a solution comprising a polymer formed by hydrolysis and condensation of one or more silane compounds represented by formula (1):



wherein R represents a linear or branched alkyl group having 1 to 8 carbons or an aryl group, and when there are two or more Rs, the Rs may be independently same or different; R' represents an alkyl group having 1 to 4 carbons, and when there are two or more R's, the R's may be independently same or different; and n is an integer from 0 to 3.

2. The composition for forming a porous film according to Claim 1 wherein said surfactant is a quaternary ammonium salt which can form micelle as dissolved.

3. The composition for forming a porous film according to Claim 1 or 2 wherein said quaternary ammonium salt is an alkyltrimethylammonium salt represented by formula (2):



wherein R'' represents a linear or branched alkyl group having 8 to 20 carbons and X represents an atom or functional group which can form anion.

4. The composition for forming a porous film according to Claim 1 or 2 wherein said aprotic polar solvent has a

dielectric constant of 20 or more.

5. The composition for forming a porous film according to Claim 1 or 2 wherein said aprotic polar solvent is one or more selected from the group consisting of acetonitrile, propionitrile, isobutyronitrile, N-methylpyrrolidone, N, N-dimethylformamide, N,N-dimethylacetamide, dimethylsulfoxide, hexamethylphosphortriamide, nitrobenzene and nitromethane.

6. A method for manufacturing a porous film comprising steps of applying said composition according to Claim 1 or 2 to a substrate so as to form a film thereon, drying the film and transforming the dried film to a porous film by removing said surfactant.

7. A porous film formable by said composition according to Claim 1 or 2.

8. An interlevel insulating film formable by said composition according to Claim 1 or 2.

9. A semiconductor device comprising a porous film therein, the porous film being formable by a composition comprising a surfactant, an aprotic polar solvent and a solution comprising a polymer formed by hydrolysis and condensation of one or more silane compounds represented by formula (1): $R_nSi(OR')_{4-n}$

wherein R represents a linear or branched alkyl group having 1 to 8 carbons or an aryl group, and when there are two or more Rs, the Rs may be independently same or

different; R' represents an alkyl group having 1 to 4 carbons, and when there are two or more R's, the R's may be independently same or different; and n is an integer from 0 to 3.

10. The semiconductor device according to Claim 9 wherein said surfactant is a quaternary ammonium salt which can form micelle as dissolved.

11. The semiconductor device according to Claim 9 or 10 wherein said quaternary ammonium salt is an alkyltrimethylammonium salt represented by formula (2):



wherein R'' represents a linear or branched alkyl group having 8 to 20 carbons and X represents an atom or functional group which can form anion.

12. The semiconductor device according to Claim 9 or 10 wherein said aprotic polar solvent has a dielectric constant of 20 or more.

13. The semiconductor device according to Claim 9 or 10 wherein said aprotic polar solvent is one or more selected from the group consisting of acetonitrile, propionitrile, isobutyronitrile, N-methylpyrrolidone, N, N-dimethylformamide, N,N-dimethylacetamide, dimethylsulfoxide, hexamethylphosphortriamide, nitrobenzene and nitromethane.

14. The semiconductor device according to Claim 9 or 10 wherein said porous film is between metal

interconnections in a same layer of multi-level interconnects or between upper and lower metal interconnection layers.